THE EFFECT OF LOGISTICS MANAGEMENT AND ELECTRONIC DATA INTERCHANGE IN ENHANCING COMPETITIVE ADVANTAGE A CASE STUDY OF SKY HANDLING PARTNER IN SIERRA LEONE

THESIS

In Partial Fulfillment of the Requirement for Master's Degree of Management

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Hereby, declare that:

1. The thesis entitled : **THE EFFECT OF LOGISTICS MANAGEMENT AND ELECTRONIC DATA INTERCHANGE IN ENHANCING COMPETITIVE ADVANTAGE A CASE STUDY OF SKY HANDLING PARTNER IN SIERRA LEONE**
   is my original work and contains no one's scientific paper that may be proposed to achieve an academic degree at any universities. Besides, there is no other's idea or citation except those which have been quoted and mentioned at the bibliography.
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FOREWORD

There has been a wider controversy between and among scholars regarding the positive and negative effect on the integration and implementation of logistics management and electronic data interchange on competitive advantage of businesses. These disagreements have increased both in the academic and business cycles.

Numerous discussions of the positive effect on logistics management and electronic data interchange adoption on competitive advantage have been undertaken by researchers, but many studies have found mix results in these relationships.

Therefore, this Thesis research has carefully examined the nexus between these operations' management and marketing disciplines. Hence, will help to reduce the controversies by examining the effect of logistics management and electronic data interchange in enhancing competitive advantage a case study of Sky Handling Partner in Sierra Leone.

Malang, 18 November 2019
Writer,

BANGALIE SUMAH

DEDICATION

I dedicate this work to my Mother Mrs. Mabinty Saymah Sumah for her love, care and words of courage to be focused to pursue my dream of higher education; and become the best I can be.

ACKNOWLEDGEMENT

To embark on this research project, series of challenges were envisaged along the way but, amid such challenges Allah has been very supportive. Thus, I would like to thank Allah for giving me the strength and wisdom for a successful completion of this research project.

Given that, I would also like to register my sincere thanks and appreciation to my Supervisors, Dr. Fien Zulfikarijah, M.M., and Dr. Ilyas Masudin, S.T., M.LogSCM., Ph.D for their professional mentorship throughout the course of this research to the end. To my Head of Department Graduate School of Management, Dr. Eko Handayanto, M.M., I say thank you for your immense input into this research and I am very grateful. To Prof. Akhsanul In'am, Ph.D Director of Directorate of Postgraduate Program, I say thank you for your words of encouragement.

To the Directorate General of Science, Technology, and Higher Education Institutional Affairs Ministry of Research, Technology, and Higher Education (RISTEKDIKTI) Republic of Indonesia I say thank you for given me the KNB scholarship opportunity and I am indebted.

Also, I want to extend thanks and appreciation to the entire BIPA-UMM Staff for their overwhelming support throughout the study period.

I would like to further express thanks to my family members whose moral support was vital to the successful completion of this study.

In conclusion, I would like to thank Yusif Lamin Conteh for all he has done in ensuring that I achieved my dream of higher education abroad.

Malang, 18 November 2019

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LIST OF ABBREVIATIONS

ANOVA: Analysis of Variance

CA: Competitive Advantage

EDI: Electronic Data Interchange

IM: Inventory Management

LM: Logistics Management

PDM: Physical Distribution Management

RBV: Resource Based View Theory

RDT: Resource Dependent Theory

SHP: Sky Handling Partner

SPSS: Statistical Package for Social Sciences

TCT: Transaction Cost Theory

TM: Transport Management

WM: Warehousing Management

3PL: Third Party Logistics

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ABSTRAK

Tujuan dari penelitian ini adalah untuk mengetahui pengaruh Manajemen Logistik dan Pertukaran Data Elektronik dalam meningkatkan Keunggulan Kompetitif, sebuah studi kasus dari Sky Handling Partner di Sierra Leone. Tujuan dari penelitian ini adalah untuk menentukan Manajemen Logistik terbaik, Pertukaran Data Elektronik dan Keunggulan Kompetitif di pasar; dan juga untuk menentukan Manajemen Logistik dan Pertukaran Data Elektronik ke Keunggulan Kompetitif. Data untuk penelitian ini dikumpulkan melalui pernyataan kuesioner terstruktur yang dikirimkan kepada responden melalui email. Sebanyak 100 kuesioner dibagikan kepada manajer senior, manajer tingkat menengah, dan manajer tingkat junior. Dari 100 kuesioner yang didistribusikan, 76 diisi dan dikembalikan yang diterjemahkan ke tingkat respons 76%. Studi ini mengadopsi metode kuantitatif melalui analisis regresi linier sederhana dan berganda; dan metode deskriptif kualitatif melalui analisis varian (ANOVA) menggunakan Paket Statistik untuk Ilmu Sosial (Versi 20) untuk menganalisis data yang diterima. Hasil penelitian ini menemukan bahwa dimensi Manajemen Logistik seperti Manajemen Transportasi, Manajemen Distribusi Fisik, Manajemen Persediaan dan Manajemen Pergudangan memiliki pengaruh positif yang signifikan terhadap Keunggulan Kompetitif; dan Outsourcing memiliki efek negatif pada Keunggulan Kompetitif. Adapun Data Elektronik Dalam Pertukaran, penelitian ini menemukan bahwa dua dari tiga dimensi seperti Komunikasi yang Lebih Baik, dan Meningkatkan Penagihan memiliki efek positif yang signifikan terhadap Keunggulan Kompetitif. Sementara akses cepat ke informasi ditemukan memiliki efek negatif yang signifikan terhadap Keunggulan Kompetitif. Hasil lebih lanjut mengungkapkan bahwa Manajemen Logistik memiliki efek positif yang signifikan terhadap Keunggulan Kompetitif; sementara Data Elektronik Dalam Pertukaran ditemukan memiliki efek negatif pada Keunggulan Kompetitif.

Kata Kunci: Manajemen Logistik, Data Elektronik Dalam Pertukaran, Keunggulan Kompetitif

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ABSTRACT

The purpose of this research was to determine the effect of Logistics Management and Electronic Data Interchange in enhancing Competitive Advantage, a case study of Sky Handling Partner in Sierra Leone. The objective of the study was to determine the best Logistics Management, Electronic Data Interchange and Competitive Advantage in the marketplace; and to also determine Logistics Management and Electronic Data Interchange to Competitive Advantage respectively. Data for this study was collected through a structured questionnaire statement sent to respondents via email. A total of 100 questionnaires were distributed to senior managers, middle-level managers and junior-level managers. Out of the 100 distributed questionnaires, 76 were filled and returned which translated to 76% response rate. The study adopted a quantitative method through simple and multiple linear regression analysis; and qualitative descriptive method through analysis of variance (ANOVA) using Statistical Package for Social Sciences (Version 20) to analyze the data received. The results of this study found that Logistics Management dimensions such as Transport Management, Physical Distribution Management, Inventory Management and Warehousing Management have a significant positive effect on Competitive Advantage; and Outsourcing has a negative effect on Competitive Advantage. As for Electronic Data Interchange, the study found that two out of the three dimensions such as Better Communication, and Improve Billing have a significant positive effect on Competitive Advantage. While quick access to information was found to have significant negative effect on Competitive Advantage. The results further revealed that Logistics Management has a significant positive effect on Competitive Advantage; while Electronic Data Interchange was found to have a negative effect on Competitive Advantage.

Keywords: Logistics Management, Electronic Data Interchange, Competitive Advantage

A. Introduction

This research investigated the effect of logistics management and electronic data interchange in enhancing competitive advantage a case study of Sky Handling Partner in Sierra Leone. Logistics, according to the Council of Supply Chain Management Professionals (CSCMP) is "that part of supply chain management that plans, implements and controls the efficient, effective forward and reverse flow and storage, service and related information between the point of origin and point of consumption in order to meet customers' requirements" (www.cscmp.org). Whilst, Electronic Data Interchange is the "electronic computer-to-computer exchange of business information in a structured format, between business trading partners or between various units within an organization" (Ferguson Hill & Hansen, 1990).

To guarantee logistics activities, Konsynski, (1993) observed that EDI is a vital element in the supply network because it facilitates frequent and automatic exchange of information and coordination needed among supply network partners. This according to Handfield, (1995) facilitate increase business transaction that yields huge benefit especially in purchasing and logistics. In effect, information management abilities can serve as a differentiating factor between a firm and its competitors (*Ozsomer, et al., 1993*). Accordingly, a carefully managed coordination of logistics and EDI among business partners is a source for competitive edge (Porter & Millar, 1985).

In today's tense market place, firms have greatly modified the approach in which they co-operate among themselves. Such modification involves, the attempt of using an integrated logistics management method to analyse and plan their supply network operations using information technology to acquire competitive edge over competitors (Katajamaki, 1999). Manufacturing short cycle time, less quality defects, less expenses and reorganize activities emerging from faster coordination with business partners have shown a clear understanding of mutual ability among firms (Minahan, 1998). These trends have paved the way for new inter-firm relationship which are core pillars of logistics ability and value.

For instance, business relationship among suppliers and customers are common in today's marketplace which is centred on time-based criteria (Brewer & Hensher, 2001). Firms integrate EDI to enhance logistics capabilities like order fulfilment and inventory control practices to less cost, improve order accuracy, short lead time, and improve responsiveness for both supply network partners (*Narayanan et al., 2009*). However, such are the objectives of present-day logistics management to increase logistics flexibility (*Gregor et al., 2005*; Neupauer & Krajcovic, 2010). While reducing cost, firms have placed quality as a top priority to attain competitiveness (Muller, 2011). Therefore, quality is a relevant tool used in determining competitive capability in the market environment (*Hassan et al., 2012*).

Competitive advantage in the words of Porter (1985) is the degree in which a company develops a secured position within the market over its competitors. That is, an edge realises over competitors through the provision to consumers added value either in the form of low cost or giving extra benefit and service that clarify parallel or possible higher prices (Cole, 2008). *Koufteros et al.,* (*1997*) categorized competitive abilities using constructs such as: competitive pricing, quality-pricing, value-to-customer quality, reliable delivery and innovative manufacturing. For this study, competitive advantage is an ability of a company to out-think its competitors through innovative means to expand its market base by attracting more customers with its goods or service (Source: Researcher). The research phenomenon Sky Handling Partner in Sierra Leone is a service-oriented company whose objective is to offer logistics and flight handling services in Sierra Leone's aviation industry.

This study attempted to reveal specific LM and EDI dimensions that consistently effect customer value and firms' competitiveness. For instance, it examined how a firm LM such as, transport management, physical distribution management, inventory management, warehousing management and outsourcing**;** and EDI drivers such as better communication, quick access to information and improve billing gives firm the competitive capability over competitors. Constructs such as cost reduction, quality, delivery, and flexibility will be considered for CA. As consumers need a better-quality product, prompt delivery and low-priced or quality-delivery-rate, firms are equally expected to meet such requirements to attain

customer satisfaction and loyalty (Source: Researcher). Specifically, the study reported in this research addressed two research problem questions as follows: 1. What are the most effective LM and EDI dimensions to be implemented to enhance CA? 2. How does LM and EDI adoption significantly enhance CA?

However, previous researches on LM and EDI adoption such as (Tracey, 1998; *Zhao et al., 2001*; Bergeron & Raymond, 1997; Mackay & Rosier 1996) have been done in developed countries, but no study of this nature has been carried out in the context of Sierra Leone as a developing nation. Thus, this current research seeks to fill that knowledge gap that has not been captured in previous studies by investigating the effect of LM and EDI in enhancing CA a case study of Sky Handling Partner in Sierra Leone. The remainder of this study is organized as follows: section 1 introduces the study background, formulation of the problem, research focus, and significance of the research. Section 2 reviews LM and EDI dimensions, research theories adopted, summary of prior research drivers, theoretical framework and the study hypothesis. Section 3 presents the research model, definitions of research variables and the adopted study methodology, sampling technique used, the study instrument, data collection technique as well as statistical analysis on validity, normality, heteroscedasticity, multicollinearity and demographic information. Section 4 presents data analysis, results and discussion. Finally, section 5 presents conclusions, recommendation and managerial implications.

B. Formulation of the Problem

Specifically, the study reported in this research addressed two research problem questions as follows:

1) What are the most effective LM and EDI dimensions to be implemented to enhance CA?

2) How does LM and EDI adoption significantly enhance CA?

C. Research Focus

The key focus of this study is to determine the following:

- To determine the best LM, EDI and CA in the marketplace
- To determine the LM and EDI to CA

D. Significance of the Study

1) The findings of this research could be productive to the management of Sky Handling Partner in Sierra Leone and other logistics companies in realizing CA

2) It could also add to existing studies on LM and EDI and serve as a possible guide for logistics companies and future researchers

A. Literature Review

B. Theoretical Review on LM and EDI Integration

1) Resource-Based View Theory (RBV)

The Resource Based View Theory originated from Edith Penrose who initially acknowledged the significance of resources in attaining a competitive advantage. She noted that the resource of firm might only add to company's competitiveness if they are utilized in a manner that their expected valuable services are made accessible to the company (Penrose, 1959). The term resource is described as anything which could be believed of as a strength or weakness of a company. In other words, a company's resources at a given period comprised of physical and non-physical assets that are tied steadfast to the company. Examples, brand names, internal knowledge of technology, hiring of skilled personnel, trade contacts, machinery, efficient procedures and capital (Wernerfelt, 1984). For Barney (1991) competitive edge is achieved by a firm's valuable (useful), rare (uncommon), imperfectly unique and non-substitutable resources. He added that, a business can attain sustainable competitive edge if its existing or potential competitors are unable to replicate the welfare of the value producing strategy.

Similarly, Barney noted that resources and capabilities of companies are diversely circulated among firms; and resource are imperfectly mobile. For this study, RBV theory is applicable to explain the competitive advantage of logistics companies because Barney's supposition reflects the real business environment in the logistics service industry. Resources are circulated differently across various logistics management, freight operators and forwarders as well as users (Wong & Karia, 2010). In conclusion, Grant (1991) indicated that companies' capabilities are the key source of competitive advantage and resources are the source of these capabilities

2) Resource Dependent Theory (RDT)

Resource Dependent Theory was first cited in the work of Pfeffer & Salancik, (1970) as they described RDT as the extent in which a firm desires external resource to realize its own aims. RDT further holds that, firms maintain some evaluation of control or impacts over resource environment or between the company's trading partners for the motive of enhancing trading stability. This is attained through the exercise of supremacy, control or collaboration of interdependency towards decreasing environmental uncertainty and a predictable flow of resources (Oliver, 1991). Accordingly, they become mutually dependent and hence joined resources to produce resource package that is unique and tough to replicate by firms outside their dependence alliance (Gitau, 2016). Thus, this theory fits into LM and EDI integration as it facilitates both vertical and horizontal integration of trading firms within the marketplace to co-operate for mutual benefits. Finally, Pfeffer & Salancik, (1970) maintain that the goal of a company is to lower its dependency on other companies and exploit the dependency of others on itself.

3) Transaction Cost Theory (TCT)

Transaction Cost Theory as an idea linked to economic co-operation among firms was presumed to be first presented by Ronald Coase (Klaes, 2000). Coase, (1937) in his work titled "The Nature of Firm" stated that it was important to familiarize an idea of "the costs of using the price mechanism, costs of carrying out the exchange transaction in the open market, or simply marketing costs" which was later popularly known as the TCT in many disciplines. Williamson, (1981) proposes that firms can lessen their transaction expenses through vertical integration and increasing the level of trust at the same time. TCT is also vital in that it offers decisive overall cost of goods after a firm has manufactured that enables it to determine the price based on existing order fulfilment, a technique adopted to enhance speedy response to high level of product variability and demand (Pine, 2006).

Based on the above, EDI technology adequately fits into the context of TCT as *Apurva Pawar et al.,* (*2017*) emphasised that EDI is utilized by supply chain partners for effective transaction and exchange of relevant information ranging

from vendors, 3PL and customers, inbound and outbound transportation, warehousing, inventory management, purchasing etc., to invoices on account receivables and payables for the smooth running of their businesses. To this end, TCT is vibrant in estimating the state in EDI integration into logistics in enhancing competitive advantage.

C. Logistics Management Dimensions

1) Transport Management (TM)

The concept of transportation is often referred to as the processes included in shipment of raw materials, component and/or finished goods from suppliers to a manufacturing or warehousing facility and sales location (Kenyon & Meixell, 2011). It could be in-bound or outbound transportation (Kumar & Shirisha, 2014). Whereas, TM involves the purchase, plan and control of transport services either by a shipper or a consignee. In current marketplace, companies perceive TM as significant because it constitutes the most expensive logistics process in many firms and very crucial to the survival of supply chain operations (Murphy & Wood, 2008). For instance, according to National Council of Physical Distribution Management (NCPDM) of America in 1982 cited in Chang, (1988 p.148) stated that the transportation expense on average amounted to 6.5% of market income and 44% of logistics costs. Hence, it is a key influential factor in logistics to connect series of separated activities, and that the absence of it to integrate divided parts an effective logistics management cannot be realized. Accordingly, it impacts the outcome of logistics activities as well as influence manufacturing and sales capability (*Tseng et al., 2005*).

In this sense, only adequate management and coordination among various elements could increase maximum profit to logistics since it occupies one-third to two-thirds of total logistics expenses and a key factor for logistics competitiveness (*Bowersox et al., 2010*). Overall, transportation offers quick response time to customer demand in an efficient and effective manner thereby enhancing customer satisfaction.

2) Physical Distribution Management (PDM)

This involves the plan and management of the movement of products onward from the end of the industrial site to a facility and then to the end consumer

(Kumar & Shirisha, 2014). In effect, logistics process comprised three kinds such as, material management- relationship between a company and its suppliers (inbound logistics), conversion management- relationship between a company and its facilities (internal operation); and PDM services such as transport, facility structure management such as warehousing site, inventory control and material handling like packaging and loading (*Williamson et al., 1990, p.69*). As a result, PDM enhances form utility by ensuring that the right quantity of finished goods is delivered to customers unspoiled. In addition, PDM service enhance "value added" through time, place and form utilities a theme that is consistent with marketing literatures (Bowersox, 1969). In conclusion, PDM service improved customer perception and satisfaction through timely fulfilment of customer orders.

3) Inventory Management (IM)

Materials and supplies constitute of inventories that companies hold specifically either for sale or as inputs to facilitates the manufacturing activity (*Mahyadin et al., 2013*). In other words, IM denotes a planned technique of procuring and storing of material to avoid stock-out (*Wisner et al., 2012*). An organization's success relies on several factors; and that one key factor is effective strategy of IM which provides information to adequately manage and coordinate internal activities such as items, equipment, people and communicate with customers. Adequate management of inventory enables a company to analyze sales, ensure timely replenishment and fulfil customer orders (*Mahyadin et al., 2013*). Ogbo & Ukpere, (2014) confirmed that inventory consist one of the biggest and most physical assets of any business and that competent management approach does not only assist to increase profit but also serve as a key differentiation between a firm and its rivals in the same market. In a nutshell, adequate IM prevents stock-out and enhance flexibility of a company to meet customers demand.

4) Warehousing Management (WM)

Warehousing is the activities concerning the storing of goods in huge quantity through an efficient and orderly way and assemble them suitably when required (Tsige, 2013). Warehousing facility performs numerous functions in facilitating supply network strategies to serve market or hold inventory to give a company means of fulfilling specific customer needs; and decrease cost in a

marketplace prone to lead time and disruption (Kirui, 2017). For instance, it offers information on specific position of inventories in a warehouse so that they can be managed effectively and enhances monitoring activities like product level, tracking of individual goods, location of goods, packaging and shipment of customer orders as well as received orders to re-stock inventory and cycle counting (www.unleashedsoftware.com). *Saleheen et al.,* (*2014*) argued that the main competitive constructs to prudent warehousing activities are quality, flexibility, and reliability which is planned to bridge the gap between demand and supply to maximize effective operation. Therefore, WM is a key enabler to a firm's supply chain capabilities.

5) Outsourcing

Outsourcing in the words of Fynes & Foss, (2005) cited in the work of Kimechwa (2015) is the subcontracting of activities, services or product parts that are not core to an organization's business, typically targeting at cost efficient, quality enhancement and delivery struggle. Foster & Muller (1990) noted that due to globalization, several factors have push companies to outsourcing activities. According to Trunick, (1989) evolving technology and flexibility of 3PL's are key indicators of outsourcing since it is sometimes expensive and time intensive to create, develop and implement new technologies internally. Hence, companies simply seek those of the 3PL providers to ensure value creation for customers which increases competitiveness and revenue through speedy and superior customer service (Daugherty & Pittman, 1995).

D. Electronic Data Interchange Dimensions

1) Better Communication

According to Ciborra & Olson (1989) EDI reduces transaction-linked expenses of coordination among companies through a standardized task and better communication among the chain members. This standardization of activities and procedures facilitates to deliver goods or services that meet customer expectations in terms of cost and time thereby increasing sales (Gottardi & Bolisani, 1996).

EDI transmission of business transaction takes less time to send messages compared to other manual transaction equipment like fax machine. It thus improves accuracy and timeliness in the flow of information amongst the trading partners (Kekre &

Mukhopadhyay, 1992). Hence, it effects efficiency improvement in trading activities (Hammant, 1995).

2) Quick Access to Information

Sokol, (1995) argues that EDI possess the ability to increase and improve trading services output by enabling faster, reliable and more efficient exchange of information amongst business partners. It enhances decreased lead-time for customer orders to receipt of products for production and/or retail companies (Greentein & Feinman, 1999). Droge & Germain (2000) asserted that with EDI inventory size and expenses are lessen by enhancing integration between business partners' information systems which permits shorter order cycles and increase turnover in inventory. With efficiency, whilst decreasing lead-time gives firms the ability to meet higher customer demand in the production cycle (*Akhavan et al., 2006*).

In another sense, *Magutu et al.,* (*2010*) claimed that EDI ensure timely response due to the speed in which the trading partners receive and integrate the information into their system thereby reducing cycle time. As a result, EDI enables firm's competitive capability through a win-win partnership nurtured by its connection such as on-time response to market dynamics (*Iacovou et al., 1995*).

3) Improve Billing

Greentein & Feinman, (1999) emphasized that EDI technology decreases transaction errors connected with manual data entry of payment invoices, receipts, credit notes etc., with better information sharing and improve tracking of business data between chain partners. Riggings & Mukhopadhyay, (1994) stated that connecting EDI trading activities re-design could result to quick payment recovery from customers and reduced order-processing errors.

In another sense, Murphy & Daley, (1999) echoed that EDI reduces expenses through the minimization of traditional paper work in transaction processing. *Sohal et al.,* (*2002*) confirmed in his study that EDI decreases data entry expenditure as well as purchase order costs. Thus, firms rely on EDI to rationalize their activities in production, supply chain management and logistics (DeCovny, 1998). In conclusion, EDI usage between trading partners improve billing accuracy that result to less paper work and less human interference in the flow of information.

E. Competitive Advantage (CA)

Prior studies have put forward numerous definitions as to what constitute competitive advantage. Among these, Cole (2008) define it as an edge attain over competitors through the provision to consumers added value either in the form of low cost or giving extra benefit and service that clarify parallel or possibly higher prices. Porter, (1985) argues that there are two categories of CA that is, either low cost or differentiation. These two combined with the scope of activities that a company desires to attain, result to three generic approaches in attaining above-average performance such as cost leadership, differentiation and focus. He added that, sustainable CA is achievable if a company can maintain performance above-average in the long-run. In contrast, Barney (1991) noted that CA is achieved by a firm's valuable (useful), rare (uncommon), imperfectly inimitable (unique) and non-substitutable resources. For this study, CA is an ability of a company to out-think its competitors through innovative means to expand its market base by attracting more customers with its goods or service (Source: Researcher).

F. Empirical Review from Previous Researches

Table 1. Papers dealing with LM

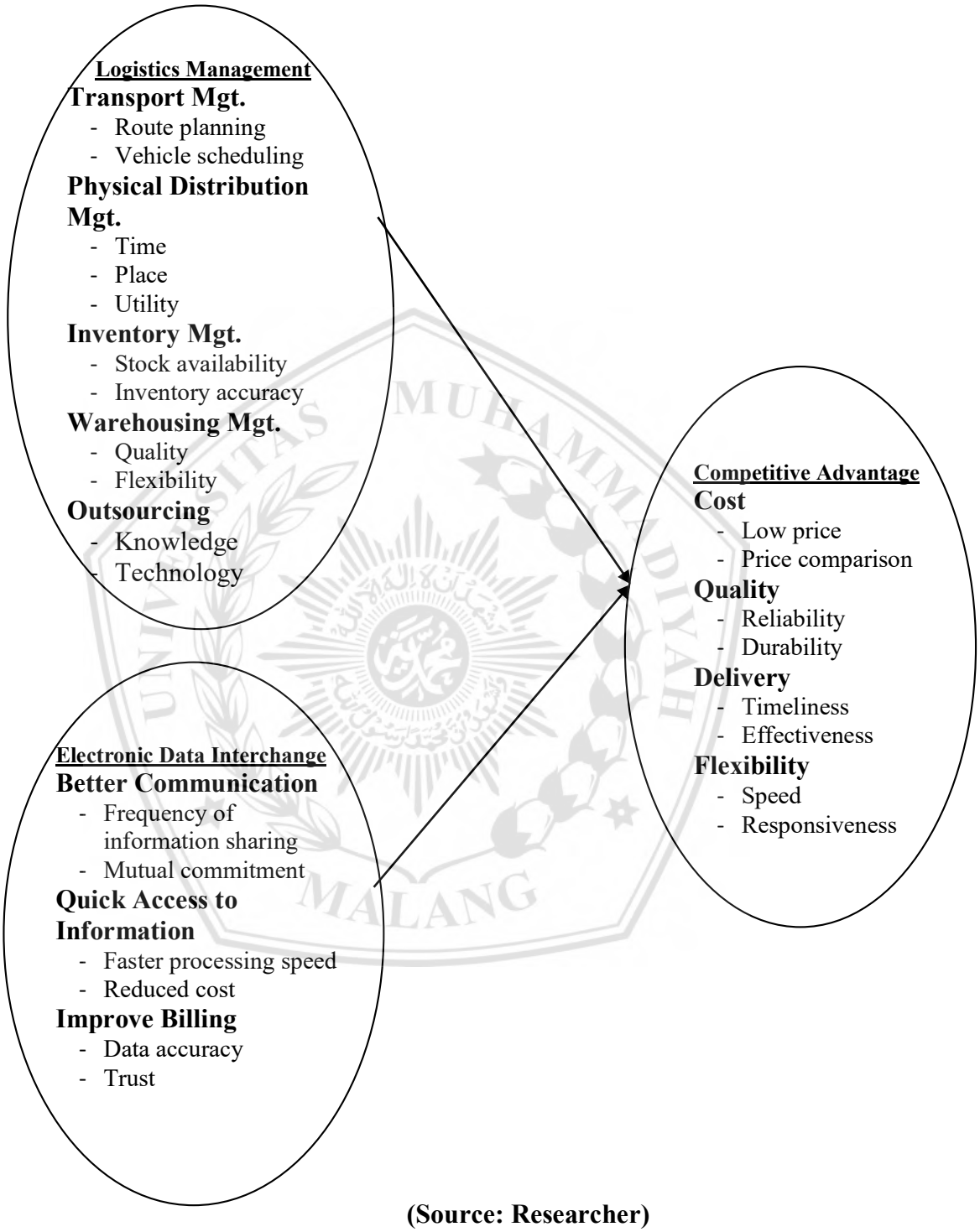
Author (s) & Year	Drivers Used
Bagshaw, (2017).	Warehousing Management, Inventory Management, Market Share and Profitability
Kirui, (2017).	Warehousing Management, Inventory Management, Transportation Management and Reverse Logistics Management
***Zhao et al* (*2001*).**	Customer-Focused Capabilities, Information-Focused Capabilities and Firm Performance
Tracey, (1998).	Physical Supply, Physical Distribution Management, Spanning Process, Manufacturing Flexibility, Customer Service and Firm Performance

Table 2. Papers dealing with EDI

Author (s) & Year	Drivers Used
***Goksoy et al.,* (*2012*).**	EDI Application, Technological Change, and Competitive Advantage
Bergeron & Raymond, (1997).	Organizational Support, Implementation Process, Control Procedures, Imposition, Integration and EDI Advantages
Ahmad & Schroeder, (2001).	Product Diversity, Product Customization, Production Instability, Organizational Size and Just-in-Time Management

Njoni et al., (*2016*).	Management Support, Clarity of Strategic Objectives, Organizational Culture and Fund Availability

G. Figure 1. Theoretical Framework



(Source: Researcher)

H. Research Hypothesis

H1: LM and EDI dimensions positively related to enhancing CA of Sky Handling Partner in Sierra Leone.

H2: LM and EDI integration positively related to enhancing CA of Sky Handling Partner in Sierra Leone.

A. Research Methods

B. Research Design

Research design is the method that is often used in conducting a survey or scientific findings to get the needed result. It allows close connection between the constructs while guaranteeing slight interference by the researcher hence, the most convenient for the study. Based on the focus of this study, a descriptive qualitative and quantitative techniques was adopted as the research design in obtaining information about the effect of LM and EDI on CA at Sky Handling Partner in Sierra Leone.

C. Definitions of Research variables

Table 3. Concept Definitions of Variables and Indicators

Variables	Indicators
Logistics Mgt: **involves "the movement and management of products and equipment from the point of origin to the point of the manufacturing, sales activity and waste disposal to enhance customer satisfaction; and improve business competitive ability" (Tilanus, 1997).** **In my opinion, LM characterize a collection of activities which ensure that the right goods and the right quantity reach the right customer unspoiled and at the right time. In short, LM facilitate the movement and management of materials or components such as raw inventories, finished or working process inventories either from the manufacturing facility to the warehouse or from the warehouse to the marketplace to satisfy customers' desires.**	**TM:** refers to the purchase, plan and control of transport services either by a shipper or a consignee. **PDM:** involves the plan and management of the movement of products outward from end of the industrial site to a facility and then to the customer. **IM:** constitutes every process involved to develop and manage the inventory levels of raw materials, semi-finished products (working-in-progress) and finished products so that enough supplies are available and the expense of over or under stock are held to the minimum. **WM:** comprises the activities concerning the storing of goods in huge quantity through an efficient and orderly way and assemble them suitably when required. (Source: Researcher) **Outsourcing:** sub-contracting of activities, services or product parts that are not core to an organization's business, typically targeting at cost efficient, quality enhancement and delivery from another company (Kimechwa, 2015).
EDI: **"process of computer to computer, business to business data transfer of repetitive business processes involving direct routing of information from one computer to another without human interference, according to predefined**	**Better Communication:** enhancement of efficient and effective exchange of information among EDI trading partners.

information formats and rules" (*Holland et al., 1992, p. 539*). **EDI is an advance form of innovative communication that enables quick exchange of vital trading information among business partners within the value chain.**	**Quick Access to Information:** enhancement of faster, reliable and more efficient exchange of information amongst EDI business partners. **Improve Billing:** refers to decrease in transaction errors connected with manual entry of payment invoices, receipts, credit note etc., from one company to the other (Source: Researcher).
CA: **defined as the ability of a company to out-think its competitors through innovative means to expand its market base by attracting more customers with its goods or service** **(Source: Researcher).**	**Cost:** involves offering competitive price **Quality:** consistent with standards to have a uniform goods and services **Delivery:** capability to offer volume of customer orders quickly. **Flexibility:** signify ability to effectively respond to the dynamics of the market environment within the shortest possible time. (Source: Researcher).

D. Type and Source of Data

For this research, primary data was sourced through the target respondents using structured questionnaire statement sent to them via email. The data from primary source was original since it has never been used or published in previous research of any kind.

E. Population and Location of the Study

The target population of this study were the employees of Sky Handling Partner in Sierra Leone. The population comprised of 200 employees. But a sample of 100 respondents were targeted for this study from both Senior managers, middle and Junior-level managers of the company. This study was conducted at the Freetown International Airport in Lungi which is co-located on the other side of the peninsula, 13km North from downtown Freetown the capital city of Sierra Leone, West Africa.

F. Sampling Technique

In this study, total population sampling technique was used as Arikunto, (2013) noted is a kind of purposive sampling method were an entire population that have a certain set of characteristics are examined that enables the researcher to collect information about respondents. Thus, sample taken for this study was 100 respondents comprising senior managers, middle and junior-level managers at Sky Handling Partner in Sierra Leone.

G. Data Collection Instrument

The data for this study was collected through a structured questionnaire statement. The questionnaire was categorised into two main sections. Section 1 denotes demographic information such as gender, age, educational qualification, year of service and position level in the organization. Section 2 presents the research questions on LM, EDI and CA respectively. Scale range was used to measure the range of chosen options from the questionnaire. 25 question statements about LM, EDI and CA were questioned to the respondents and scale items was measured on a 5-point Likert scale, where 1 denotes Strongly Disagree, 2 Disagree, 3 Less Agree, 4 Agree and 5 Strongly Agree.

H. Data Analysis

For this study, both descriptive qualitative and quantitative methods were used as part of data examination using the support of SPSS Version 20. Simple and multiple linear regression statistics with Analysis of Variance (ANOVA) were adopted to statistically determine the effect of LM and EDI in enhancing CA at Sky Handling Partner in Sierra Leone.

I. Classical Assumption Test

All the variables and dimensions set in this research were first checked for validity and reliability to ascertain that the data was fit for further analysis. The former was tested using Pearson Product Moment Correlation through SPSS Version 20. It was done by correlating each item questionnaire scores with the total score. Item-item questionnaire that significantly correlated with total score indicates that items are valid. The latter using Cronbach's Alpha which is an estimate of the internal consistency associated with the scores that are obtained from a small scale or composite score. Thus, all dimensions of the independent variables examined fall in the category of high reliability scores.

Normality using One-Sample Kolmogorov-Smirnov Test and heteroscedasticity tests were conducted to see whether the items set met the required standards. The output from the SPSS Version 20 revealed the data LM, EDI and CA were normally distributed and have no heteroscedasticity problem.

The variance inflation factor (VIF) was used to check the extent of a multicollinearity problem if any. The simple regression equation containing the

interaction terms revealed normal VIF value < 10 indicating no multicollinearity problem.

1) Multicollinearity Test

The results output by processing the primary data shows the coefficients output- collinearity statistics obtained the VIF value of 1.372 for transport management; a VIF value of 1.038 for physical distribution management; a VIF value of 1.470 for inventory management; a VIF value of 1.633 for warehousing management and a VIF value of 1.389 for outsourcing.

Also, the coefficients output- collinearity statistics indicates a VIF value of 1.028 obtained for better communication, a VIF value of 1.053 for quick access to information; and a VIF value of 1.075 for improve billing. This as well indicates that the VIF value obtained are between 1 to 10. Hence, it can be concluded that there are no multicollinearity symptoms present in LM and EDI dimensions. The result can be seen below in table 4.1.3 and 4.1.4.

Table 4.1.3: Multicollinearity Test

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-3.869	4.779		-.810	.421		
Transport Management	1.492	.294	.430	5.083	.000	.729	1.372
Physical Distribution Management	.728	.288	.186	2.529	.014	.963	1.038
Inventory Management	.783	.329	.209	2.380	.020	.680	1.470
Warehousing Management	.860	.276	.288	3.114	.003	.613	1.633
Outsourcing	.144	.207	.059	.693	.491	.720	1.389

a. Dependent Variable: Competitive Advantage

Source: primary data processed 2019.

Table 4.1.4: Multicollinearity

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
	(Constant)	12.330	3.965		3.109	.003		
	Better Communication	1.349	.325	.341	4.156	.000	.972	1.028
	Quick Access to Information	-.670	.230	-.243	-2.920	.005	.950	1.053
	Improve Billing	1.899	.271	.589	7.017	.000	.930	1.075

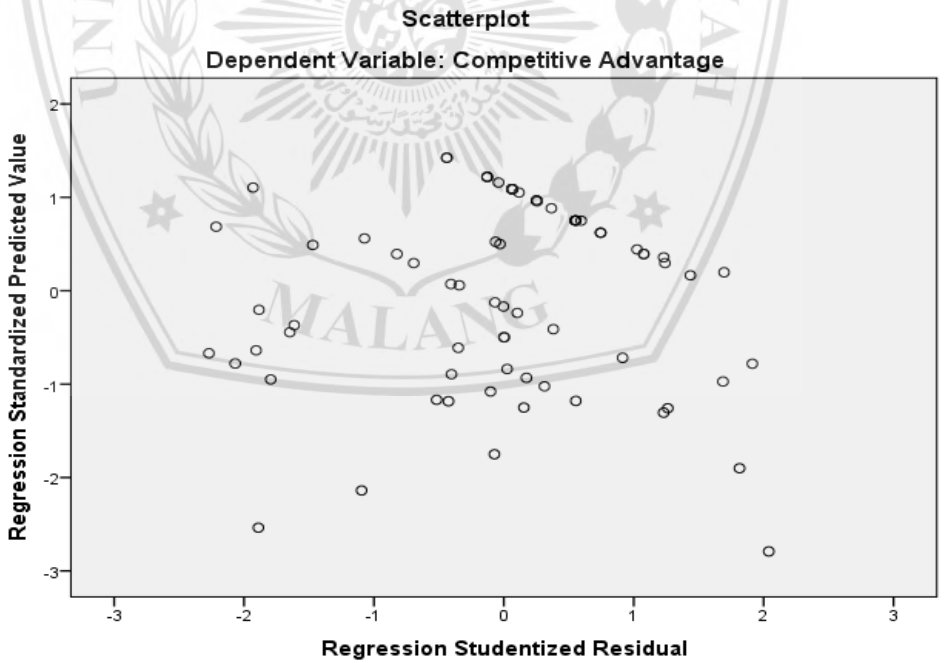
a. Dependent Variable: Competitive Advantage

Source: primary data processed 2019.

2) Heteroscedasticity Test

The scatterplot chart output shown below from the primary data processed indicates that the spots are spread and do not form a clear or specific pattern. So, it can be concluded that the regression model contains no heteroscedasticity problem.

Figure 2.



J. Demographic Information of Respondents

1) Gender of Respondents

Based on the results obtained for this research, an overview of the gender of the respondents can be seen in table 4.2 as follow:

Table 4.2: Gender of Respondents

		Frequency	Percent
Valid	Male	41	53.9
	Female	35	46.1
	Total	76	100.0

Source: primary data processed 2019.

The table above shows gender distribution of respondents in which the dominant sex among the respondents were male with a percentage of 53.9%. This implies that the management of Sky Handling Partner in Sierra Leone is male dominated.

2) Age of Respondents

According to the results obtained from this study, the age distribution of the respondents can be seen below in table 4.2.1

Table 4.2.1: Age of Respondents

		Frequency	Percent
Valid	18-25 yrs	12	15.8
	26-30 yrs	11	14.5
	31-37 yrs	28	36.8
	38-45 yrs	25	32.9
	Total	76	100.0

Source: primary data processed 2019.

The above results indicate that the respondents with age ranging between 31-37 years are in the majority among the workforce with 36.8%. This implies that the research had most of the company's management being youthful and productive. This is far below the retirement age of sixty years stipulated by the constitution of Sierra Leone.

3) Educational Qualification of Respondents

The results for educational qualification of the respondents can be seen below in table 4.2.2.

Table 4.2.2: Educational Qualification of Respondents

		Frequency	Percent
Valid	Diploma	32	42.1
	Bachelor's Degree	34	44.7
	Master's Degree	10	13.2
	Total	76	100.0

Source: primary data processed 2019.

The results in table 4.2.2 revealed that majority 44.7% of the respondents had bachelor's degree. This means that Sky Handling Partner in Sierra Leone employs more workers with bachelor's degree because they desire efficiency in the organization. The study can thus be concluded that the respondents have adequate educational qualification.

4) Year of Service

The results designate that majority 63.2% of the respondents had lengthy year of service between 5-10 years. It means that, Sky Handling Partner in Sierra Leone had employees with long duration of service hence, reliable to give up-to-date responses to the questionnaires distributed for this research. This result can be seen below in table 4.2.3

Table 4.2.3: Year of Service

		Frequency	Percent
Valid	5-10	48	63.2
	10-15	18	23.7
	15-20	9	11.8
	21	1	1.3
	Total	76	100.0

Source: primary data processed 2019.

5) Position Level in the Organization

Based on the results of the study, an overview of respondent's position level in the organization can be seen in table 4.2.4 as follow:

Table 4.2.4: Position Level in the Organization

		Frequency	Percent
Valid	Senior Management	12	15.8
	Junior Management	41	53.9
	Middle Level Management	23	30.3
	Total	76	100.0

Source: primary data processed 2019.

The results in table 4.2.4 above shows that 53.9% junior management employees are in the majority among the workforce of Sky Handling Partner in Sierra Leone. This implies that respondents from the junior level management are crucial to the success of logistics and EDI integration management of the company.

A. Data Analysis, Results and Discussions

B. Response Rate

This study targeted a sample of 100 employees at Sky Handling Partner in Sierra Leone. The respondents comprised senior managers, middle and junior-level managers of the company. The major objective of this research was to determine the best LM, EDI and CA in the marketplace and LM and EDI to CA respectively. However, out of the 100 distributed questionnaires via email, 76 were filled and returned. This translated to a response rate of 76%. This response was satisfactory enough and represented the study population. Hence, it is in line with Mugenda & Mugenda, (2003) stipulation that a response rate of 70% and above is excellent.

C. Analysis Between LM and EDI Dimensions on CA

This aspect of the study seeks to determine the best LM, EDI and CA in the marketplace at Sky Handling Partner in Sierra Leone. To achieve this, a multiple linear regression analysis was used to examine the effect of both LM and EDI dimensions on the dependent variable (competitive advantage). The regression

results analysis on LM and EDI dimensions that influence on the dependent variable (competitive advantage); and the regression equation are presented below:

Regression Analysis

Table 4.3: Regression Analysis

Indicators of Variables	Regression Coefficient	T- Count	Sig.	VIF
Constant		-.005	.996	
Transport Mgt. (X1)	.327*	3.629	.001	1.783
Physical Distribution Mgt. (X2)	.103***	1.368	.176	1.242
Inventory Mgt. (X3)	.157**	1.831	.072	1.619
Warehousing Mgt. (X4)	.245*	2.740	.008	1.758
Outsourcing (X5)	.042	.524	.602	1.400
Better Communication (X6)	.177**	2.372	.021	1.224
Quick Access to Information (X7)	-.187*	-2.592	.012	1.137
Improve Billing (X8)	.180**	1.789	.078	2.209
F Count				19.038
R²				.700

Source: primary data processed 2019.

Detail Information

Dependent Variable = Competitive Advantage

* = Significant error real at α = 0.01 (99% confidence level)

** = Significant error real at α 0.05 (95% confidence level)

*** = Significant error real at α = 0.1 (90% confidence level)

ttable df N – 1 = 75 (α = 0.01) = 2.37710 Ftable df N1 – 8 = 67 (α = 0.01) = 2.91

ttable df N – 1 = 75 (α = 0.05) =1.66543 Ftable df N1 – 8 = 67 (α = 0.05) = 2.15

ttable df N – 1 =75 (α = 0.1) = 1.29294 Ftable df N1 – 8 = 67 (α = 0.1) = 1.81

- **Regression Equation**

$$y = -0.05 + 0.327\,x_1 + 0.103\,x_2 + 0.157\,x_3 + 0.245\,x_4 + 0.042\,x_5 + 0.177\,x_6 + -0.187\,x_7 + 0.180\,x_{8+}e$$

The results of the above equation analysis can be interpreted as follows:

1) Analysis of Variance (ANOVA/Test F/F Count Analysis)

As shown on table 4.3 above, the regression results show that the F count is > Ftable. The value of F count is 19.038 whilst, the Ftable is 2.91 at α = 0.01. It can be concluded that the regression equation model used has been good, because the dimensions of the independent variables (transport management, physical

distribution management, inventory management, warehousing, management, outsourcing, better communication, quick access to information and improve billing) results simultaneously affect the dependent variable (competitive advantage).

2) T Test Analysis/Partial Test

This partial test aims to determine how the dimensions of the independent variables individually can have a significant influence on CA. It is done by comparing the t count value with t table value, then to know the degree of freedom using the formula df = n – 1 - k = 67. It obtained the biggest value of 2.37710 by using a significant level minimum at $\alpha = 0.01(1\%)$ and maximum at $\alpha = 0.1$ (10%). The value of t is calculated for each variable dimension and could be seen below. After testing the hypothesis for this study, the results indicate as follows:

- **H0:** indicators (transport management, physical distribution management, inventory management, warehousing management, outsourcing, better communication, quick access to information and improve billing) not enhanced on CA.
- **H1:** indicators (transport management, physical distribution management, inventory management, warehousing management, outsourcing, better communication, quick access to information and improve billing) enhanced or effective on CA.

3) Determination of the Coefficient Analysis (R^2)

Table 4.3 above shows an R^2 value of 70% which indicates that the dimensions of the independent variables (transport management, physical distribution management, inventory management, warehousing, management, outsourcing, better communication, quick access to information and improve billing) do explain real conditions of the dependent variable (competitive advantage). The rest (100% - 70% = 30%) is explained by other variables not included in the model. From the results of the classical assumption test and the regression model test above, it can be concluded that the regression model in this study can be accepted as good model and is feasible to use. The effect of each variable dimensions on the dependent variable (competitive advantage) is tested with the significance of the regression coefficient (t test) as follows:

D. Analysis of the Significance of LM and EDI Dimensions on CA

1) Logistics Management Dimensions on Competitive Advantage

This part of the study analyses the multiple regression results obtained from the SPSS Version 20 output on the effect of logistics management dimensions on the dependent variable (competitive advantage). Below are the tested LM dimensions analysis:

a) Transport Management (X1)

The results of the multiple regression in table 4.3 above, indicates that LM dimension (transport management) regression coefficient significantly positive effect on the dependent variable (competitive advantage) seen from the t value > t table at $\alpha = 0.01$ calculated value of 3.629 whilst, the t table value of 2.37710; and obtained significant or significantly different from zero (0). The regression coefficient on the dimension (transport management) is 327 meaning that it has a positive effect on (competitive advantage). This means that, if transport management is integrated with modern technology in LM it will enhance increased revenue for the company.

b) Physical Distribution Management (X2)

As shown on table 4.3 above, the results of multiple regression reveal that LM dimension (physical distribution management) regression coefficient significantly positive effect on the dependent variable (competitive advantage) seen from the t value > t table at $\alpha = 0.1$ calculated value of 1.368 whilst, the t table value of 1.29294; and obtained significant or significantly different from zero (0). Regression coefficient on the dimension (physical distribution management) is 103 implying that it has a positive effect on (competitive advantage). Therefore, this implies that if on-time delivery is prioritized in LM to serve customer needs at the right time and place has the potential to boost sales and ultimately increased company's competitive advantage.

c) Inventory Management (X3)

The multiple regression results in table 4.3 above, indicates that LM dimension (inventory management) regression coefficient significantly positive effect on the dependent variable (competitive advantage) seen from the t value > t table at $\alpha = 0.05$ calculated value of 1.831 whilst, the t table value of 1.66543; and

obtained significantly different from zero (0). The regression coefficient on the dimension (inventory management) is 157 indicating that it has a positive effect on the dependent variable (competitive advantage). It can be concluded that if adequate inventory management is fitted with modern tracking technology like EDI reveals real-time information on inventory records to avoid stock-out and ensure inventory availability thereby increasing return on asset (ROA); and firms' competitive capability.

d) Warehousing Management (X4)

The multiple regression results above in table 4.3, shows that LM dimension (warehousing management) regression coefficient significantly positive effect on the dependent variable (competitive advantage) seen from the t value > t table at α = 0.01 calculated value of 2.740 whilst, the t table value of 2.37710; and obtained significant or significantly different from zero (0). Regression coefficient on the dimension (warehousing management) is 245 meaning that it has positive effect on the dependent variable (competitive advantage). It implies also that if a warehousing facility is fitted with modern technological tracking system it will give real-time information on inventory location and eventually result to increase competitiveness for the company.

e) Outsourcing (X5)

The results from the multiple regression in table 4.3 above, indicates that LM dimension (outsourcing) regression coefficient has a negative effect on the dependent variable (competitive advantage) seen from the t value 0.524 is < t table 1.29294 seen from at α = 0.1. The regression coefficient on the dimension (Outsourcing) is 42 indicating a negative effect on the dependent variable (competitive advantage). This study assumed that because outsourcing is an expensive enterprise in LM less attention was given to it.

2) Electronic Data Interchange Dimensions on Competitive Advantage

This part of the study analyses the multiple regression results from the SPSS Version 20 output on the effect of EDI dimensions on the dependent variable (competitive advantage). Below are the tested EDI dimensions analysis:

a) Better Communication (X6)

The multiple regression results in table 4.3 above, shows that EDI dimension (better communication) regression coefficient significantly positive effect on the dependent variable (competitive advantage) seen from the t value > t table at α = 0.05 calculated value 2.372 whilst, the t table value of 1.66543; and obtained significant or significantly different from zero (0). The regression coefficient on the dimension (better communication) is 177 implying that it has a positive effect on the dependent variable (competitive advantage). This implies that the use of EDI technology to share vital business-to-business ideas is an integral part to company's competitive capability.

b) Quick Access to Information (X7)

The regression results in table 4.3 above, indicates that EDI dimension (quick access to information) regression coefficient significantly negative effect on the dependent variable (competitive advantage) seen from the t value > t table at α = 0.01 calculated value of -2.592 whilst, the t table value of 2.37710; and obtained significant or significantly different from zero (0). Regression coefficient on the dimension (quick access to information) is -187 meaning that it has a significant negative effect on the dependent variable (competitive advantage). It can be said that electronic transfer of business information among trading partners ensures speedy transaction, collaboration and eventually CA.

c) Improve Billing (X8)

The regression results in table 4.3 above, shows that EDI dimension (improve billing) regression coefficient significantly positive effect on the dependent variable (competitive advantage) seen from the t value > t table at α = 0.05 calculated value of 1.789 whilst, the t table value of 1.66543; and obtained significant or significantly different from zero (0). Regression coefficient on the dimension (improve billing) is 180 indicating that it has a positive effect on the dependent variable (competitive advantage). This result implies that using technology especially EDI in business transaction minimizes issues of error in cash transaction among business partners thereby leading to CA.

E. Analysis of the Independent Variables LM and EDI on CA

This aspect of the research seeks to determine LM and EDI to CA. To accomplish this, a multiple linear regression analysis through SPSS Version 20 was used to determine the effect of LM and EDI on the dependent variable (competitive advantage). Below are the tested LM and EDI results on CA, regression equation and analysis.

Regression Analysis

Table 4.3.4: Regression Analysis

Variables	Regression Coefficient	T- Count	Sig.	VIF
Constant		-.295	.769	
Logistics Management (X1)	.725*	8.111	.000	1.335
Electronic Data Interchange (X2)	.050	.555	.581	1.335
F Count				**47.140**
R²				**.564**

Source: primary data processed 2019.

Detail Information

Dependent Variable = Competitive Advantage

* = Significant error real at α = 0.01 (99% confidence level)

** = Significant error real at α 0.05 (95% confidence level)

*** = Sig. error real at α = 0.1 (90% confidence level)

t table df N – 1 = 75 (α = 0.01): = 2.37710 F table df N1 – 8 = 67 (α = 0.01): = 2.91

t table df 75 (α = 0.05): =1.66543 F table df 67 (α = 0.05): = 2.15

t table df 75 (α = 0.1): 1.29294 F table df 67 (α = 0.1): = 1.81

- **Regression Equation**

$$y = -0.295 + 0.725\,x_1 + 0.050x_2 + e$$

The results of the above equation can be interpreted as follows:

1. Constant value = -0.295 indicates that if there is no x_1 and x_2 then there will be no CA
2. β1 value = 0.725 indicates that if LM increases more, then the higher CA
3. β2 value = 0.050 indicates that if EDI increases more, then the higher CA

1) Analysis of Variance (ANOVA/Test F/F Count Analysis)

As shown on table 4.3.4 above, regression results show that the F count is > Ftable. The value of F count is 47.140 whilst, the Ftable is 2.91 at $\alpha = 0.01$. It can be concluded that the regression equation model used has been good, because the independent variables (LM and EDI) results simultaneously affect the dependent variable (competitive advantage). After testing the hypothesis for this study, the results indicate as follows:

H0: LM and EDI indicates no effect on CA

H1: LM and EDI indicates effect on CA

2) Determination of the Coefficient Analysis (R^2)

Table 4.3.4 above shows an R^2 value of 56.4% which indicates that the independent variables (LM and EDI) do explain real conditions of the dependent variable (competitive advantage). The rest (100% - 56.4% = 43.6%) is explained by other variables not included in the model. From the results of the classical assumption test and the regression model test above, it can be concluded that the regression model in this study can be accepted as good model and is feasible to use. The effect of each independent variable on the dependent variable (competitive advantage) is tested with the significance of the regression coefficient (t test) as follows:

F. Analysis of the Significance of Independent Variables LM and EDI on CA

a) Logistics Management (X1)

The results of the multiple regression in table 4.3.4 above, indicates that the variable (logistics management) regression coefficient significantly positive effect on the dependent variable (competitive advantage) seen from the t value > t table at $\alpha = 0.01$ calculated value of 8.111 whilst, the t table value of 2.37710; and obtained significant or significantly different from zero (0). The regression coefficient on the variable (logistics management) is 725 meaning that the variable has a positive effect on (competitive advantage). This implies that, if LM is well-developed to respond to customer needs within the required time-frame, place and quantity of product will increase business competitiveness.

b) Electronic Data Interchange (X2)

The results from the multiple regression in table 4.3.4 above, indicates that the variable (electronic data interchange) regression coefficient has a negative effect on the dependent variable (competitive advantage) seen from the t value 0.555 is < t table 1.29294 seen from at $\alpha = 0.1$. The regression coefficient on the variable (electronic data interchange) is 50 indicating a negative effect on the dependent variable (competitive advantage). This study assumed in the context of the research area (developing nation) that the growth of EDI technology is in the preliminary stage since its infrastructure may be feeble which poses challenges to businesses within the EDI chain.

G. Opinion Discussion on the Outcome of the Dimensions of Independent Variables on CA

The outcome of the multiple regression results indicates that dimensions of the independent variables (transport management, physical distribution management, inventory management, warehousing management, better communication, and improve billing) all together had significant positive effect on the dependent variable (competitive advantage). With quick access to information having a significant negative effect on CA. However, only outsourcing had a negative effect on the dependent variable (competitive advantage). This study assumed that because outsourcing is an expensive enterprise in LM less attention was given to it or due to service quality problem and inadequate capability of the 3PL to meet user requirement. According to *Gotzamani et al.,* (*2010*) service quality is a relevant principle that determines both logistics outsourcing and the 3PL selection requirement. As for EDI effect on CA, while its dimensions (better communication and improve billing) were found to have significant positive influence on CA, quick access to information had a negative significant effect on CA. EDI as a variable alone was found to have a negative effect on CA. This study assumed in the context of the research area (developing nation) that the growth of EDI technology is in the introductory stage since its infrastructure may be feeble which poses challenges to businesses within the EDI chain. This confirmed Lang Xiong, (2017) assertion that in developing nations EDI growth is still in the preliminary stage as the infrastructure is still weak which makes it difficult for

businesses to realize its benefits compared to developed countries where the technology has advanced considerably.

Accordingly, one of the major focus of this study was to determine the best LM, EDI and CA in the marketplace and LM and EDI to CA respectively. It proves that seven dimensions of the independent variables highlighted above are key drivers in enhancing Sky Handling's CA. Similarly, the researcher assumed that the study outcome was good enough because the demographic information revealed a positive educational qualification of the study population. For instance, the result shows that majority 44.7% of the respondents had bachelor's degree which specifies that the company's recruitment policy placed premium on hiring qualified personnel to stay competitive among rivals in the same industry. This results support Gibson & Lorin Cook (2001) study which maintains that to deliver quality service in present-day hostile business environment, competitive, rising marketplace, it is important for logistics companies to develop an effective human resource plan to ensure successful acquisition of qualified managers.

Also, the researcher believed that the age of the respondents plays a critical role in the results outcome of this study. For example, the results revealed an overwhelming majority of the respondents 36.8% aged between 31-37 years which is quiet below 40 years. It can be concluded that Sky Handling Partner in Sierra Leone has a very productive workforce that is strategic in attaining CA in Sierra Leone's logistics industry. This is in line with the study of Vostrikova, (1970) who confirmed that age occupies a vital component in demographic statistics as it plays a major role in terms of growth. In conclusion, the above defence shows that the population of this study were qualified enough to give up-to-date information regarding LM and EDI on CA.

H. Discussion

1) LM and EDI Dimensions on CA

a) Transport Management (X1)

The multiple regression results above, shows that LM dimension transport management has a significant positive effect on competitive advantage as seen from the calculated t value > t table. The regression coefficient obtained implies that a unit increase in transport management dimension as a LM strategy will led to

increase in the scores of CA with the assumption that other dimensions are held constant. Transport management is a core pillar in LM as it connects different parts of the logistics process. It offers quick response time to customer demand in an efficient and effective manner thereby enhancing customer satisfaction.

The result above supports *Mbondo et al.,* (*2015*) study which holds that the absent of well-developed transport management system, logistics could not realize its full strength. In this sense, a well-managed transport system in logistics process could provide better logistics effectiveness, minimize operation expense and promote service-quality and competitive capability. The result also supports the study of *Ristovska et al.,* (*2017*) which maintains that continuous monitoring, control and improve transport management system allows timely delivery of customer orders and eventually forecast, minimize cost; and future transportation expenditures.

b) Physical Distribution Management (X2)

The multiple regression results presented above, indicates that LM dimension physical distribution management has a significant positive effect on competitive advantage as seen from the calculated t value > t table. The regression coefficient obtained means that a unit increase in physical distribution management dimension as a LM strategy will led to increase in the scores of CA with the assumption that other dimensions are held constant. Physical distribution ensures timely delivery of customer orders undamaged, with the right quantity, right location and at the right time. Uzel, (2018) agreed on the above result who holds that customers evaluate their distributors efficiency and effectiveness on order-processing and delivery. *Mbondo et al* (*2015*) study also agreed to the above result and confirmed that efficient physical distribution strategy from the producer to the end-consumer ensure organizational competitiveness.

c) Inventory Management (X3)

The multiple regression results above, revealed that LM dimension inventory management has a significant positive effect on competitive advantage as seen from the calculated t value > t table. The regression coefficient obtained means that a unit increase in inventory management dimension as a LM strategy will led to increase in the scores of CA with the assumption that other dimensions

are held constant. Thus, inventory optimization using EDI technology decreases inventory shrinkage and ensures real-time information to prevent stock-out. In the same vein, the study of *Ristovska et al.,* (*2017*) agreed with the above result suggesting that firm's control of inventory level electronically ensures drastic reduction of inventory quantity referred to as "dead" capital tied to storage. The easier an inventory control system, the more purchasing ease it becomes. Hence, inventory expenses are low. This result also supports the study of *Musau et al.,* (*2017*) which indicates that inventory optimization has the potential to improved inventory and material flow.

d) Warehousing Management (X4)

The multiple regression results presented above, shows that LM dimension warehousing management has a significant positive effect on competitive advantage as seen from the calculated t value > t table. The regression coefficient obtained means that a unit increase in warehousing management dimension as a LM strategy will led to increase in the scores of CA with the assumption that other dimensions are held constant. In this sense, a warehousing facility fitted with state-of-the-art tracking system like EDI technology will enhanced real-time information on inventory location in the warehousing facility resulting to company's competitiveness. This result above, agreed with the study of *Ristovska et al.,* (*2017*) as they noted that the electronic records of all goods stored in a warehousing facility enables the control of storage expenses to be quick, better, easier and thus decreasing storage cost and total cost respectively. On the same token, Bagshaw (2017) study supports this study result adding that the role of a warehousing facility is to store goods in order to respond to customer needs and assemble customer orders.

e) Outsourcing (X5)

The multiple regression results presented above, indicates that LM dimension outsourcing has negative effect on competitive advantage as seen from the calculated t value < t table. The regression coefficient obtained means that a unit decrease in outsourcing dimension as a LM strategy will led to decrease in the scores of CA with the assumption that other dimensions are held constant. However, this study assumed that because outsourcing is an expensive enterprise

in LM less attention was given to it. This study result thus supports the study of Gilley, & Rasheed, (2000) in which they confirmed that transaction expenses linked to outsourcing particularly overseas is expensive.

f) Better Communication (X6)

The multiple regression results above, shows that EDI dimension better communication has a significant positive effect on competitive advantage as seen from the calculated t value > t table. The regression coefficient obtained means that a unit increase in better communication dimension as an EDI integration strategy in LM will led to increase in the scores of CA with the assumption that other dimensions are held constant. Integrating EDI in LM increases enterprise collaboration through quality communication service among trading partners. Thus, this study result supports the study of Bergeron & Raymond, (1997) who confirmed that EDI benefits improves the quality of communication, transaction speed, decreases institutional expenses as well as increase business competitiveness. Also, the study of Murphy & Daley, (1999) agreed with the above result as they affirmed that EDI decreases traditional paper work as it enhances significant increase in information quality in terms of accessibility, accuracy and efficient customer service experience.

g) Quick Access to Information (X7)

The multiple regression results above, indicates that EDI dimension quick access to information has a significant negative effect on competitive advantage as seen from the calculated t value > t table. The regression coefficient obtained implies that a unit increase in quick access to information dimension as an EDI integration strategy in LM will led to decrease in the scores of CA with the assumption that other dimensions are held constant. EDI integration in LM offers trading partners the chance to initiate quick respond mechanism and share vital enterprise information. The above result supports the studies of (Murphy & Daley, 999; *Riddle et al., 1999*; Bergeron & Raymond, 1997; *Magutu et al., 2010*) as they observed that EDI enhanced transaction speed, decrease communication expense, and enable users to quickly send and received information on purchase orders, invoices within the value chain.

h) Improve Billing (X8)

The multiple regression results above, indicates that EDI dimension improve billing has a significant positive effect on competitive advantage as seen from the calculated t value > t table. The regression coefficient obtained implies that a unit increase in improve billing dimension as an EDI integration strategy in LM will led to increase in the scores of CA with the assumption that other dimensions are held constant. With EDI, errors in business transactions such as order-processing, and cash payment are minimized. This study result is in line with Murphy & Daley, (999) study which proposed that using EDI, order-processing and billing can extremely increase the capabilities of EDI members within the value chain. Hence, it characterizes a key element of electronic commerce to facilitates transaction among logistics trading partners.

2) LM and EDI on CA

a) Logistics Management (X1)

The multiple regression results presented above, shows that the variable LM has a significant positive effect on CA as seen from the calculated t value > t table. The regression coefficient obtained implies that a unit increase in LM variable will led to increase in the scores of CA with the assumption that the other independent variable is held constant. LM add value to product as it ensures customer orders are fulfilled within the stipulated time-frame, place and quantity. This study results agreed *Helmy et al.,* (*2018*) study which states that logistics management processes are vital to firm's realization of added value comparative to its expenses. Moreover, this study result is consistent with Azeem, (2018) study which echoed that efficient logistics management processes and capabilities of a firm can result to success. He argues that, logistics management initiates the movement of raw materials in a planned method which reduces operational expenses and ensure process efficiency to meet customer and marketplace expectations. Hence, competitive advantage based on customer satisfaction and realisation of market needs are possible through effective logistics management. For instance, competitive advantage comprised of price advantage as well as value advantage. The former, offers benefit of low price on manufacturing and movement of goods, whilst the latter builds perception and firm's image within the business environment.

Similarly, *Prokhorova et al.,* (*2016*) confirmed the above result that logistics management guarantees the activities of product movement in an orderly way with safe and timely delivery to the end customer which offers firm the competitive capability. Thus, logistics service firms ensure on-time order-processing and fulfilment with the right quantity, quality which the final consumer value most. *Ristovska et al.,* (*2017*) study is also consistent with this study findings as they affirmed that logistics management in current business environment co-ordinates and integrates the flow of raw materials and/or finished goods from physical or information aspect.

b) Electronic Data Interchange (X2)

The multiple regression results presented above, shows that the variable EDI has a negative effect on CA as seen from the calculated t value < t table. The regression coefficient obtained implies that a unit decrease in EDI variable as a LM integrating strategy will led to decrease in the scores of CA with the assumption that the other independent variable is held constant. However, this study assumed in the context of the research area (developing nation) that the growth of EDI technology is in the introductory stage since its infrastructure may be feeble which poses challenges to businesses within the EDI chain. This confirmed Lang Xiong, (2017) assertion that in developing nations EDI growth is still in the preliminary stage as the infrastructure is still weak which makes it difficult for businesses to realize its benefits compared to developed countries where the technology has advanced considerably. Laryea, (1999) study provides a strong support to this study's assumption as he emphasized that unlike developed nations, developing nations are faced with acute EDI hi-tech capability which makes them lagged in realizing its benefits. He noted further that the infrastructure for EDI implementation is relatively weak or not feasible since technical infrastructure like hardware and software accessories, electricity supply, and skilled personnel to design, install or repair the EDI system when faulty are limited which poses difficulties for business to realize the benefits it offers.

In the same vein, McCubbery & Gricar, (1995) noted that unlike developed nations, developing nations are faced with lack of knowledge in computers and communication facilities such as hardware and software, spare parts and

maintenance, availability of information technology suppliers and retailers, training and development. Finally, Ma'aruf & Abdulkadir, (2012) findings provides support as they reaffirmed Laryea's study that EDI offers outstanding growth prospects for businesses in developing nations but argues that prevailing limitations are its weak infrastructure like equipment and skilled workers to maintain the system.

A. Conclusions

The conclusions that can be drawn from the results of this study are written as follows:

Based on the order or sequence of the regression coefficient obtained, transport management stood out to be the most effective or best LM dimension preceded by warehousing management. Quick access to information emerged as the best EDI dimension followed by improve billing, better communication; and inventory management. Hence, this study answers the first part of the research problem question and the research objective respectively.

Also, LM emerged to significantly enhanced CA, while EDI does not enhanced CA. But, the adoption of both seems to enhance CA through a strong coefficient correlation. Meaning that integrating both together enables faster, and reliable exchange of vital trading information that connects LM activities among trading partners thereby increasing profitability. This answers the second part of the research problem question and the study objective.

Furthermore, this study examined five dimensions of LM such as transport management, physical distribution management, inventory management, warehousing management and outsourcing to determine their effect on CA at Sky Handling Partner in Sierra Leone. The results of the study found that four dimensions like (transport management, physical distribution management, inventory management and warehousing management) have significantly positive effect on CA as indicated by their t value > t table and a strong coefficient correlation. The overall effect of the analysed dimensions was very high as indicated by the coefficient of determination. Meanwhile, outsourcing has a negative effect on CA.

As for EDI, three dimensions were examined and that two out of the three dimensions such as (better communication and improve billing) the study results

found a significantly positive effect on CA at Sky Handling Partner in Sierra Leone as indicated by their t value > t table; and a strong coefficient correlation. Whilst, quick access to information was found to have a significant negative effect on CA as indicated by its t value > t table with a strong negative coefficient correlation.

The study further examined LM and EDI on CA. The results of the study found that LM has a significantly positive effect on CA at Sky Handling Partner in Sierra Leone as indicated by t value > t table and a strong coefficient correlation. While, EDI has a negative effect on CA as seen from t value < t table.

Therefore, this study concludes that all the dimensions used in this research for both LM and EDI except outsourcing provide a strong relationship to CA. Accordingly, integrating LM and EDI on CA was found that the research variable EDI alone has no significant influence on CA while, two out of its three dimensions (better communication and improve billing) were found to have significant positive influence on CA. The other, quick access to information had a significant negative effect on CA. This study assumed in the context of the research area (developing nation) that the growth of EDI technology is in the introductory stage since its infrastructure may be feeble which poses challenges to businesses within the EDI chain. This confirmed Lang Xiong, (2017) assertion that in developing nations EDI growth is still in the preliminary stage as the infrastructure is still weak which makes it difficult for businesses to realize its benefits compared to developed countries where the technology has advanced considerably.

B. Recommendation

The research recommended that:

- Since, most previous research on EDI integration in LM were done typically in the context of developed nations, thus, this study still recommends additional research in the context of developing nation to expand on the framework of this study using other industries or possibly same in order to validate this study results.
- Also, outsourcing be given a management support to increase operational efficiency and effectiveness.

C. Managerial Implications

This research has numerous implications for management that include:

- Firms should seek suitable integrating information system and be ready to give full managerial support with the primary goal of re-engineering logistics process and improving competitive capability.
- Strategic alliance with supportive logistics trading partners is significant in the adoption of an integrated information system like EDI.
- Developed a suitable framework to justify the investment in LM and EDI in terms of financial and institutional competitiveness.
- Top management support is one of the key elements for a successful EDI integration in LM operations.

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APPENDICES LIST

Research Questionnaire

Dear Respondent,

I am a student at the Graduate School of Management University of Muhammadiyah Malang, Indonesia pursuing a Master's Degree in Operations Management at the Economics and Business Faculty.

The aim of distributing questionnaires is to collect information on a Thesis Research I am conducting as partial fulfilment of the course to assess ***"The Effect of Logistics Management and Electronic Data Interchange in Enhancing Competitive Advantage a case study of Sky Handling Partner in Sierra Leone". Note*** that the information you provide will be treated as confidential and used only for the completion of this study.

Thank you for your willingness to fill out the questionnaire.

Respondents Identity: Please check mark **(✓)** the appropriate box below:

Section 1: Demographic Information

1. **Gender:** ☐Male ☐Female
2. **Age:** ☐18-25 ☐26-30 ☐31-37 ☐38-45 ☐Any other, specify…….
3. **Educational Qualification:** ☐Diploma ☐Bachelor's Degree ☐Master's Degree
4. **Year of Service:** ☐5-10yrs. ☐10-15yrs. ☐15-20yrs. ☐Any other, specify……...
5. **Position level in the organization:** ☐ Senior Management ☐ Junior Management ☐ Middle-Level Management ☐ Any Other, Specify……
6. **Section 2: Questionnaire Statements**

Instructions: Please read the following statements carefully and then select one of the answers provided on the right-hand corner by a check mark **(✓)** on the correct answer according to you.

***SD = Strongly Disagree *D = Disagree *LA = Less Agree *A = Agree *SA = Strongly Agree**

No	Statement	Scoring Scale				
1.	**Logistics Management Dimensions**	**SD**	**D**	**LA**	**A**	**SA**
	Transport Management					
	a. Identifying safe and decongested route for transportation of goods to meet customer needs without delay can enhance company's competitiveness in the marketplace					
	b. Effective arrangement of vehicles for the transportation of goods from the warehouse to customers in good order can enhance competitive advantage					
	Physical Distribution Management					
	a. Timely distribution of goods to customers when needed influences business competitiveness					
	b. Ensuring that goods distributed to customers reach at the right place and in right order and/or quantity positively impact competitive advantage					
	c. Distributing goods to customers undamaged maximize their utility which enhance company's competitive advantage					
	Inventory Management					
	a. Continuously ensuring that there is an availability of stock through demand forecast to meet high customer demand can enhance competitive advantage					
	b. Maintaining satisfactory record of stock to be able to determine when stocks are low or high can influence firm's competitive advantage					
	Warehousing Management					
	a. A warehouse that has the facility to preserve goods in standard and ensure that they are in good quality enhances competitive advantage					
	b. Arranging goods in an orderly manner that makes it easier or flexible to locate within the warehouse positively impacts competitive capability					

	Outsourcing					
	a. Outsourcing service to a Third Party with the right expertise can significantly enhance competitive advantage					
	b. Applying advanced technology in the operation of logistics activities can impact competitive advantage					
2.	**Electronic Data Interchange Dimensions**					
	Better Communication					
	a. Frequent exchange of relevant business information among EDI trading partners improves competitive advantage					
	b. Maintaining mutual commitment among EDI partners to facilitate logistics activities can influence competitive advantage					
	Quick access to Information					
	a. Providing producers with relevant specification of required goods in advance can influence competitive advantage					
	b. Electronic data interchange usage among business partners to exchange vital business information enhances reduced costs and competitive capability					
	Improve Billing					
	a. Using EDI to maintain up-to-date data records of transaction among the EDI trading partners can impact competitive advantage					
	b. Providing accurate information among EDI business partners to avoid discrepancy that ensure trust and confidence can lead to competitive advantage					
3.	**Competitive advantage**					
	Cost					
	a. Ensuring cost minimization of operation and labor to achieve company's objective enhances competitive advantage					
	b. Offering prices as lower than competitors that customers can					

	compare influence competitive advantage					
	Quality					
	a. A company that offer products or services that are highly reliable can enhance competitive advantage					
	b. Providing products to customers that are very durable impacts competitive advantage					
	Delivery					
	a. Fulfilling customer order on-time enhances company's competitive advantage					
	b. Responding effectively to customer demands than competitors influence competitive capability					
	Flexibility					
	a. Enhancing quick delivery service of customer order influences competitive advantage					
	b. Responding to customer needs whenever and wherever impacts firm's competitive advantage					

Table 4.1: Validity Test

Variable (LM = X1)	Indicators	r count	r tabel (n=76, α=0.05%)	Information
Transport Management	X1.1	0.783	0.2227	Valid
	X1.2	0.918	0.2227	Valid
Physical Distribution Management	X2.1	0.555	0.2227	Valid
	X2.2	0.488	0.2227	Valid
	X2.3	0.596	0.2227	Valid
Inventory Management	X3.1	0.700	0.2227	Valid
	X3.2	0.892	0.2227	Valid
Warehousing Management	X4.1	0.675	0.2227	Valid
	X4.2	0.889	0.2227	Valid
Outsourcing	X5.1	0.824	0.2227	Valid
	X5.2	0.880	0.2227	Valid
CA (Y) Cost	Y1.1	0.852	0.2227	Valid
	Y1.2	0.807	0.2227	Valid
Quality	Y2.1	0.696	0.2227	Valid
	Y2.2	0.839	0.2227	Valid
Delivery	Y3.1	0.743	0.2227	Valid
	Y3.2	0.804	0.2227	Valid
Flexibility	Y4.1	0.863	0.2227	Valid
	Y4.2	0.892	0.2227	Valid

Source: primary data processed 2019.

Variable (EDI = X2)	Indicators	r count	r tabel (n=76, α=0.05%))	Information
Better Communication	X1.1	0.594	0.2227	Valid
	X1.2	0.878	0.2227	Valid
Quick Access to Information	X2.1	0.782	0.2227	Valid
	X2.2	0.883	0.2227	Valid
Improve Billing	X3.1	0.754	0.2227	Valid
	X3.2	0.925	0.2227	Valid
CA (Y) Cost	Y1.1	0.852	0.2227	Valid
	Y1.2	0.807	0.2227	Valid
Quality	Y2.1	0.696	0.2227	Valid
	Y2.2	0.839	0.2227	Valid
Delivery	Y3.1	0.743	0.2227	Valid
	Y3.2	0.804	0.2227	Valid
Flexibility	Y4.1	0.863	0.2227	Valid
	Y4.2	0.892	0.2227	Valid

Source: primary data processed 2019.

Table 4.1.1: Reliability Test

Indicators of Variables	Cronbach Alpha	Status
Transport Management (X1)	0.862	Reliable
Physical Distribution Management (X2)	0.630	Reliable
Inventory Management (X3)	0.830	Reliable
Warehousing Management (X4)	0.821	Reliable
Outsourcing (X5)	0.866	Reliable
Competitive Advantage (Y)	0.750	Reliable
Better Communication (X6)	0.790	Reliable
Quick Access to Information (X7)	0.854	Reliable
Improve Billing (X8)	0.830	Reliable
Competitive Advantage (Y)	0.750	Reliable

Source: primary data processed 2019.

Table 4.1.2: Normality Test

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		76
Normal Parameters[a,b]	Mean	0E-7
	Std. Deviation	2.43492102
Most Extreme Differences	Absolute	.152
	Positive	.095
	Negative	-.152
Kolmogorov-Smirnov Z		1.325
Asymp. Sig. (2-tailed)		.060

a. Test distribution is Normal.
b. Calculated from data.

Source: primary data processed 2019.

Figure 3. Normality Probability Plot Graph

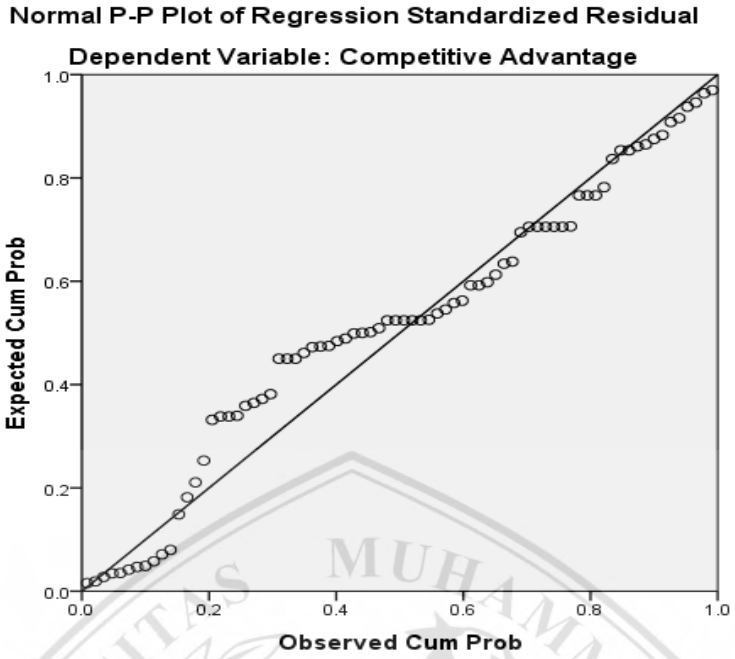

Table 4.1.3: Multicollinearity Test

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-3.869	4.779		-.810	.421		
Transport Management	1.492	.294	.430	5.083	.000	.729	1.372
Physical Distribution Management	.728	.288	.186	2.529	.014	.963	1.038
Inventory Management	.783	.329	.209	2.380	.020	.680	1.470
Warehousing Management	.860	.276	.288	3.114	.003	.613	1.633
Outsourcing	.144	.207	.059	.693	.491	.720	1.389

a. Dependent Variable: Competitive Advantage

Source: primary data processed 2019.

Table 4.1.4: Multicollinearity

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	12.330	3.965		3.109	.003		
Better Communication	1.349	.325	.341	4.156	.000	.972	1.028
Quick Access to Information	-.670	.230	-.243	-2.920	.005	.950	1.053
Improve Billing	1.899	.271	.589	7.017	.000	.930	1.075

a. Dependent Variable: Competitive Advantage

Table 4.1.5: Multicollinearity

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
	(Constant)	-1.255	4.252		-.295	.769		
	Logistics Management	.704	.087	.725	8.111	.000	.749	1.335
	Electronic Data Interchange	.083	.150	.050	.555	.581	.749	1.335

a. Dependent Variable: Competitive Advantage

Source: primary data processed 2019.

Table 4.3.1: Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.833[a]	.694	.658	2.156

a. Predictors: (Constant), Improve Billing, Better Communication, Quick Access to Information, Physical Distribution Management, Outsourcing, Inventory Management, Warehousing Management, Transport Management

b. Dependent Variable: Competitive Advantage

Source: primary data processed 2019.

Table 4.3.2: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	707.651	8	88.456	19.038	.000[b]
	Residual	311.296	67	4.646		
	Total	1018.947	75			

a. Dependent Variable: Competitive Advantage

b. Predictors: (Constant), Improve Billing, Better Communication, Quick Access to Information, Physical Distribution Management, Outsourcing, Inventory Management, Warehousing Management, Transport Management

Source: primary data processed 2019.

Table 4.3.3: Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-.027	5.240		-.005	.996		
Transport Management	1.134	.313	.327	3.629	.001	.561	1.783
Physical Distribution Management	.402	.294	.103	1.368	.176	.805	1.242
Inventory Management	.590	.322	.157	1.831	.072	.618	1.619
Warehousing Management	.733	.268	.245	2.740	.008	.569	1.758
Outsourcing	.102	.195	.042	.524	.602	.714	1.400
Better Communication	.701	.295	.177	2.372	.021	.817	1.224
Quick Access to Information	-.516	.199	-.187	-2.592	.012	.880	1.137
Improve Billing	.579	.324	.180	1.789	.078	.453	2.209

a. Dependent Variable: Competitive Advantage

Source: primary data processed 2019.

Table 4.3.5: Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.751[a]	.564	.552	2.468

a. Predictors: (Constant), Electronic Data Interchange, Logistics Management

b. Dependent Variable: Competitive Advantage

Source: primary data processed 2019.

TABLE 4.3.6: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	574.284	2	287.142	47.140	.000[b]
	Residual	444.663	73	6.091		
	Total	1018.947	75			

a. Dependent Variable: Competitive Advantage

b. Predictors: (Constant), Electronic Data Interchange, Logistics Management

Source: primary data processed 2019.

Table 4.3.7: Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-1.255	4.252		-.295	.769		
Logistics Management	.704	.087	.725	8.111	.000	.749	1.335
Electronic Data Interchange	.083	.150	.050	.555	.581	.749	1.335

a. Dependent Variable: Competitive Advantage

Source: primary data processed